

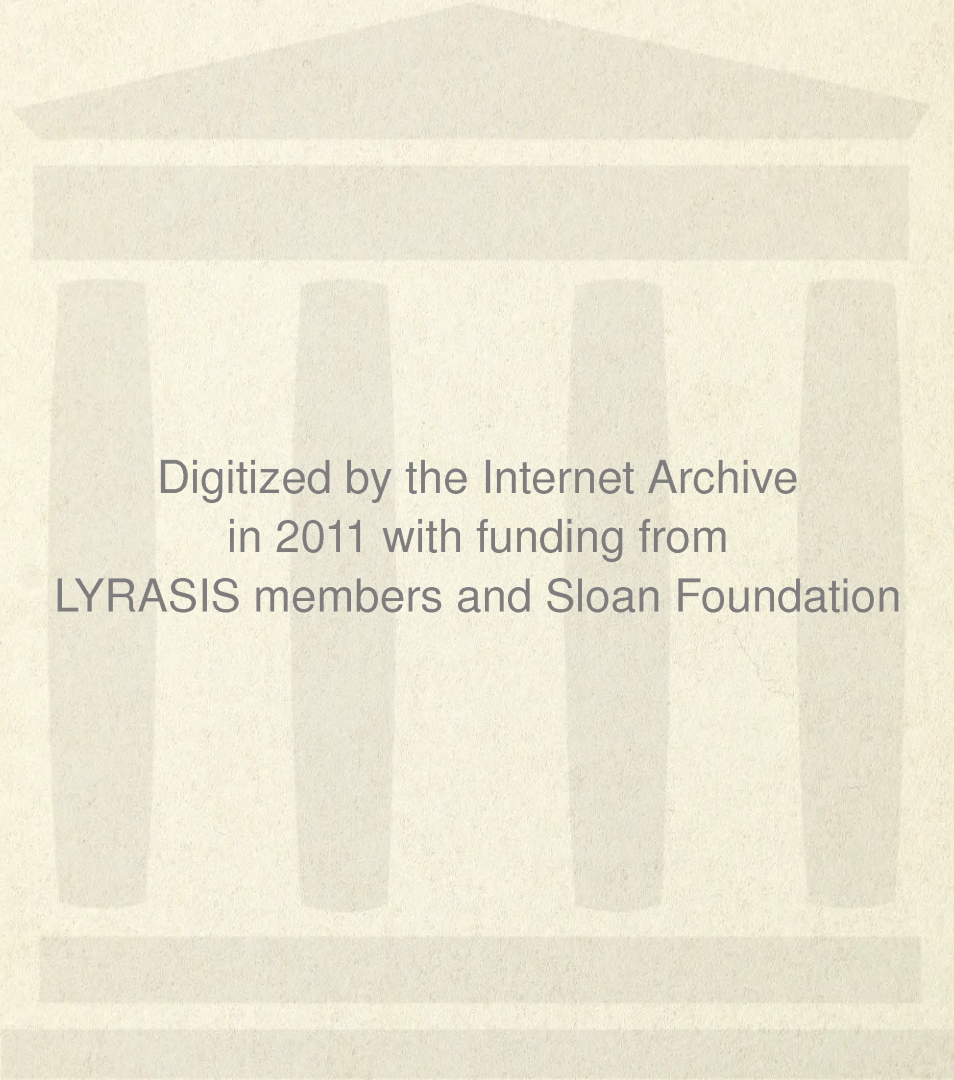
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HEALTH SURVEY OF RALEIGH

Compiled by

C. E. Terry





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# **HEALTH SURVEY OF RALEIGH**

**JANUARY, 1918**



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# HEALTH SURVEY OF RALEIGH

COMPILED BY

DR. C. E. TERRY

AND PRESENTED TO RALEIGH BY

THE CHILD WELFARE DEPARTMENT OF  
THE WAKE COUNTY COUNCIL  
OF NATIONAL DEFENSE

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JANUARY, 1918

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RALEIGH  
EDWARDS & BROUGHTON PRINTING CO.  
1918







# HEALTH SURVEY OF RALEIGH

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COMPILED BY DR. C. E. TERRY

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*To the City Commissioners, DR. W. W. STANCELL, Health Officer, MRS. T. P. HARRISON, Chairman of Child Welfare Committee of Wake County, the Delineator Survey Committee, and Other Citizens of Raleigh.*

LADIES AND GENTLEMEN:—It is with much gratification that we acknowledge herewith the very cordial coöperation that has been accorded Miss Nannie J. Lackland and Mr. Walter L. Dodd, during the conduction of the Delineator survey in Raleigh. Especially would we thank Dr. W. W. Stancell, Health Officer, the City Government, Mr. W. T. Davis, Registrar of the Local Board of Health, Dr. Gordon, Department of Vital Statistics, and Mr. W. H. Booker, Bureau of Engineering and Education, State Board of Health, Mrs. T. P. Harrison, Chairman of Child Welfare Committee of Wake County, Mrs. J. R. Chamberlain, Chairman of Wake County Committee of Woman's Council of National Defense, the local newspapers, *News and Observer* and *Evening Times*, the Woman's Club, Mrs. T. W. Bickett, Mrs. Fred Mahler, President of the Child Conservation League, the chairman of the Survey Committee, the Rotary Club, Chamber of Commerce, Dr. L. F. Koonce, Meat and Milk Inspector, proprietor of Yarborough Hotel, Thompson Electrical Company, and the committees who have so generously assisted our nurse.

As the measure of success of any public undertaking depends upon the interest and ability to coöperate of thinking individuals, we feel that the future health activities of your city are well assured.

In presenting the findings of your committees and our agents, we do not claim to portray with absolute accuracy all of the health debits and credits of the city. We feel, however, that the results represent quite fairly general situations and may be taken as fundamentally true and used as a foundation upon which to base corrective measures.

In our suggestions we have not attempted to outline a complete health program, but rather to direct attention to certain matters which we feel are most deserving of early official consideration. We believe that their institution will be convincing as to the value of more active health work, and that as results become apparent and public interest increases, the desire to undertake other needed reforms and, in general, to extend departmental activities, will inevitably develop.

In our criticisms we have endeavored to be constructive, but feel that any argument for a change in official activities would be futile, except it were based on existing conditions shown to be harmful.



### VITAL STATISTICS

Complete and accurate vital statistics are fundamental to effective public health work. Without reliable statistics of deaths the health officer cannot tell what diseases are seriously attacking the citizens; while without prompt and complete birth registration he cannot compute the infant death rate or initiate the best type of baby-saving work.

The work for better vital statistics of the North Carolina State Board of Health has drawn National attention and has secured the State's acceptance in the Registration Area established by the United States Bureau of the Census. With regard to Raleigh, we are glad to say that during the course of our investigation we found no evidence that deaths occurring within the city limits are escaping registration. While a few minor discrepancies have existed, as in the registration of stillbirths, we feel that the local registration of deaths may be taken as complete. The quality of registration has improved in recent years, and is still improving. The effort should be continued to the end that the information appearing on all certificates be as full, clear, and revealing as possible.

With regard to the registration of births, we would state that the situation in Raleigh is more than usually satisfactory. The recent canvass resulted in the discovery of only eight unregistered births, and, while there is doubtless some further error, the corrected rates indicate birth registration to be more than 90 per cent complete. The corrected birth rate for the city is 27.1 per thousand population; the white rate being 25.1 and the colored 31.0. It is probable that the checking of birth reports throughout the year, instead of after the completion of the year, as was the case in the recent canvass, would result in still more complete registration.

Taking all the deaths registered in 1917, and using the population estimate of the United States Bureau of the Census, the city's crude death rate was 28.4 per 1,000 population. On the same basis the rate has varied from 24.9 to 30.4, and has averaged 27.8 during the last five years. These are high figures; they are partly due to the Negro population and partly to the presence of nonresidents. If Negroes be excluded, the city's rate for the five-year period is 23.0, as against the Negro rate of 36.2. Taking the matter from another standpoint, if deaths of nonresidents be excluded, the general death rate for 1917 is 20.9, that for whites 17.0, that for Negroes being 27.9. These figures, which are based on a very favorable criterion as to nonresidence, are still high. The excessive figure among Negroes is a familiar phenomenon, and reflects the conditions under which they live.

The above rates are based on the Census estimates of population, this being the standard practice. If the local estimate of 24,000 population be used, somewhat more favorable rates will, of course, be obtained. This figure includes, however, all persons in institutions and schools, so that exclusion of deaths among such persons would not be a fair



basis of computation. Using this figure and total deaths registered in 1917 gives a general death rate of 24.0.

It would appear, therefore, that Raleigh's death rate indicates marked opportunity for reduction. Such an indication is confirmed by an examination of the causes of death certified by physicians during the past year. In that time, out of 576 deaths, 47 were stated to be due to tuberculosis. Twenty-seven were due to lobar pneumonia; ten to typhoid fever; three to whooping-cough; two to specific venereal diseases; and one to diphtheria. Eighty little babies died before reaching their first birthday, and of these a half could have been saved by well-established health department activity. Altogether, it seems safe to say that a fourth or a third of all the deaths that occur in Raleigh are from avoidable causes.

This is not an unusual state of affairs, nor is the proportion of avoidable deaths among residents materially different from that of all persons dying within the city limits. During the last five years the tuberculosis rate has varied between 203.2 and 312.6 per 100,000 population, and has averaged 257.2. For this period the average rate for whites has been 189.6, while that for Negroes has been 374.2. The typhoid rate has averaged 56.1; the figure for whites being 37.9, as against 87.4 for Negroes. Restricting the matter to resident deaths only, which is certainly too favorable a basis, the city's tuberculosis rate in 1917 was 177.6; that for whites being 131.0, that for Negroes 260.2. The Negro rate is huge; the white one is materially higher than need be.

While Raleigh suffers from high death rates—general and specific—it is only fair to say that this condition is common throughout the South. At the same time, this is not properly an extenuating circumstance for neglect. It indicates rather the presence of a problem of unusual urgency, and puts a premium on health protective effort. We feel confident that the measures recommended elsewhere in this report will, if adopted, secure a marked reduction in the amount of sickness and death in the city, and that the expenditures involved will prove a very profitable investment. Meanwhile we would emphasize the importance of continued and added efforts in the line of making Raleigh's vital statistics complete and accurate.

### INFANT MORTALITY

There were registered in Raleigh during 1917 a total of 543 births. Of these, 323 were white and 220 colored. The birth rates determined on these figures are 26.8 per thousand for both white and colored, and by races 24.9 for whites and 30.1 for colored.

During the recent canvass there were discovered eight unregistered births, two white and six colored. The corrected birth rate is 27.1 for both races, the corrected white rate being 25.1 and the colored rate 31.0.

These rates bespeak extremely good birth registration, and the city



registrar is certainly to be congratulated upon the efficient manner in which he has performed his duties. The error discovered, during the canvass, is small, and, while this does not wholly represent the actual error, it is pretty safe to assume that birth registration is well over 90 per cent complete.

During the same year, 1917, there occurred 80 deaths of infants under one year of age. On the basis of 551 births, Raleigh's infant mortality rate would be 145.4 per thousand births. By races, the rates are 89.3 for whites and 225.7 for colored. While the white rate is not especially high, the colored rate is extremely high, and this, of course, conduces to the high general rate of 145.4.

In the appropriate tables the births and birth rates and infant deaths and death rates, for the five-year period, 1913 to 1917, are shown by races.

While the infant mortality rate of Raleigh has varied during this five-year period, there is no evidence of a progressive reduction. The contrary rather is true. This obtains not only for the general rate, but for both the white and colored rates, and it would appear that active infant welfare work were needed, if the infant death rate of the city is to be brought to a reasonable figure.

As a basis for study, we have taken the deaths of infants under one year for the three-year period, 1915 to 1917, by certified causes. These total 230, exclusive of stillbirths. We have classified these deaths according to those susceptible to prenatal influences, those susceptible to postnatal influences, and a residuum due to all other causes. Such a grouping is quite satisfactory where reasonably good certification exists, and it is employed because of the fact that appropriate measures directed at deaths falling under these different classes involve varying activities.

Under the first heading of deaths susceptible to prenatal influences we find a total of 103 deaths. Sixty-six of these are due to prematurity. In addition to these, there are recorded, during the same period (1915 to 1917), 133 stillbirths. The same general methods of control apply both to causes of prematurity and to those responsible for still-bearing. It is well recognized by those who have studied prenatal influences and tendencies that the physical well-being of the newborn baby depends very largely upon the conditions surrounding prenatal life; that the mother's condition, habits, modes of life, and her surroundings exert a very direct influence, and that measures aimed at their improvement will affect favorably, as might be expected, the vitality of her offspring. While it is impossible to state how many of these might have been prevented, it is certain that a considerable number might have been saved had adequate supervision of the health of mothers been carried out during pregnancy.

In order to throw further light on the conditions surrounding infant life in Raleigh, our field nurse has visited the homes of the eighty babies



dying during the year 1917, and from parents, near relatives, or the attending physician, has investigated the circumstances under which these babies lived and died.

In connection with still-bearing and prematurity, it is noteworthy that only twenty of these mothers received any prenatal supervision or instruction, and that this was confined, for the most part, to more or less infrequent urinalyses. Had the required examinations and measurements been taken prior to the time of confinement, and the mothers kept under expert supervision, it is quite possible that many of these deaths could have been prevented. Thus, we find that ignorance on the part of mothers and public neglect, through the city's lack of facilities for the prenatal supervision of child-bearing women, both operated to terminate these lives scarcely more than begun.

Congenital malformations, as a whole nonpreventable, were responsible for four deaths and congenital debility for twenty-one. Here, again, is the prenatal life of the baby largely responsible for deaths from this cause. Other causes peculiar to early infancy, but which cannot be discussed as a group, were responsible for twelve deaths.

Of the deaths susceptible to postnatal influences, which also total 103, fifty-six were due to digestive disturbances, such as gastritis, diarrhea and enteritis, cholera infantum, etc. It is quite well known that a great proportion of deaths from these causes are preventable. They are due, most frequently, to improper feeding, as with unclean or impure foods or foods entirely unsuitable for infant consumption. In our individual histories we find that practically every artificial food was administered to babies whose mothers were unable to nurse them, and that but rarely was the choice of food or the method of its administration under the direction of a physician. We find, further, that, of the eighty babies who died during 1917 and whose home surroundings have been investigated, privies were the only means of sewage disposal in thirty-two, and that protection from insects was not had in fifty-three of these homes. It is quite possible that fly-borne infection of the food of many Raleigh babies takes place, through the combination of flies and unsanitary privies.

It is quite probable that a number of the mothers who did not nurse their babies might have done so, had they been properly instructed and encouraged in this most important duty of motherhood.

Pneumonia and bronchitis were responsible together for thirty-three deaths. It is generally conceded that about one-half of the pneumonias of infancy are preventable, due as they are to improper clothing, exposure, and other conditions susceptible of control. Whooping-cough, meningitis, and tuberculosis, all controllable and communicable diseases, were responsible for eleven deaths, and congenital syphilis for three. Certainly these latter might have been readily prevented had both mothers and babies secured rational treatment.



Under the third general heading of "All Other Causes" there occurred twenty-four deaths. A number of deaths were included in this classification because of the fact that the certified cause of death was not possible of any other classification. Thus, there were several cases where babies had been found dead and no cause discoverable. In the case of others, the use of indefinite terms was present, as "convulsions," "odema of the throat," "spasmodic convulsions," "indioptic convulsions," etc. That certain deaths were classified under this group is also accounted for in part by the fact that a number of these babies had no medical attention at the time of their last illnesses. Thus, our case histories for 1917 show that, of the eighty deaths of infants which occurred during this year, two were attended at death by a midwife and eleven had no attention whatever. Practically all of these are impossible of definite classification.

Presented differently in the case of 103 babies and 133 stillbirths, the certified cause of death was such as to indicate that death was the result of the mother's condition previous to birth, and in 103 instances to unfavorable conditions arising after birth. We are very much inclined to believe that considerably more than one-half of these babies might have been saved had adequate methods of control been utilized.

It would not do to close the consideration of causes operating in Raleigh, that make for high infant mortality, without some mention of midwives. The birth records show that 27.4 per cent of babies are attended at birth by these women.

Any one familiar with their superstitions and customs will admit the danger of entrusting to their care mothers and babies at the time of child-birth. In Raleigh it would appear that the situation, as it exists, is one worthy of the most serious consideration. We should not lose sight of the fact that many of the most dangerous conditions to which human flesh is heir arise during gestation and confinement. In no field of medicine or surgery is there necessity for the display of better judgment or more ability. Few surgical conditions demand such instantaneous decision and prompt and skillful interference, as, not infrequently, two lives are in jeopardy and are saved or lost in the space of a few minutes.

Infections which occur at the time of birth may be of the most serious nature, yet it is quite evident that none of the midwives of Raleigh have the slightest conception of the dangers to which they subject their patients. They do not know the meaning of the phrase "surgical cleanliness," and we are inclined to believe that no inconsiderable portion of the city's early infant mortality is attributable to this ignorance on their part. We would refer especially to tetanus neonatorum or lock-jaw of the newborn. It is noteworthy that this condition does not appear among the certified causes of deaths of babies during the past three years, yet from a careful consideration of the causes as defined we feel convinced that it is by no means an uncommon one. This is



corroborated in three cases by information obtained by the field nurse and included by her in the case histories.

The infection is one which is received at the time of birth, through unclean methods of cutting and dressing the cord. It signifies that either the hands, the instruments, or the dressings of the birth attendant were not clean. It is, therefore, without excuse in good practice. When once it develops, the condition is uniformly fatal, the mortality being 100 per cent; yet of all causes of infant deaths there is none more easily preventable.

The greater number of deaths from this cause occur between the fifth and twentieth days of life. This period is one in which we do not expect to find operating many of the usual causes of early infant mortality. Thus, for example, deaths due to congenital malformations usually occur before the fifth day, as do also many of the deaths from prematurity and the more marked cases of congenital debility.

Likewise, deaths from digestive disturbances are not to be looked for during this period (five to twenty days), for, if there is any time during an infant's life when it is presumably properly fed, it is during the first month. For the most part, even those mothers who will later discontinue to nurse their babies are nursing them at this time. The same time barrier exists as far as the acute contagions are concerned, and during the first month it is uncommon for infants to be exposed and succumb to these maladies.

While, therefore, deaths may occur, in this period, from any of the causes which as a class we have eliminated, they are not, as already stated, to be expected. Tetanus, however, is preëminently a cause of death which operates at this time. In fact, it is extremely doubtful if a death from tetanus occurs earlier than the fourth or fifth day of life, and likewise must we conclude that deaths from this cause, later than the twentieth day, are quite rare.

It is also true that the tetanus bacillus is more prevalent in the South than in certain other sections of the country. As a general rule, it is most prevalent in tropical and subtropical regions. Bearing these facts in mind, one is forced at once to the conclusion that the character of the birth attendance is of vital importance and might quite conceivably influence profoundly the number of infant deaths occurring from this disease.

Turning for a moment to the deaths of Raleigh babies, which have occurred during this so-called "tetanus period," we note thirty-four during the years 1915, 1916, and 1917. The birth attendants of these babies were in fifteen cases midwives, and in nineteen cases physicians. Assuming that midwives were the birth attendants, during 1915 and 1916, of approximately the same percentage of babies born as during 1917, i. e., 27.4, it is at once apparent that the fatality rate during this age period is considerably greater in the practice of midwives than in that of physicians. Thus, in 1915, it was 2.65 for midwives and 1.75 for



physicians; in 1916, 4.6 for midwives and 1.75 for physicians; in 1917, 2.8 for midwives and 1.3 for physicians.

While we would not state definitely that all of these deaths are due to tetanus, we feel reasonably certain, from observation in other places and because of the facts noted above, that a considerable proportion of them are due to this cause, and that many of them can be prevented by the exercise of more care by the birth attendant, whether physician or midwife.

One very simple and efficient means of control consists in furnishing, alike to physicians and midwives, sterile umbilical dressings, and, in the case of midwives especially, emphatic instructions as to the need for asepsis in the dressing of the cord. We have seen a very marked reduction, during this age period, even though they were not certified to as tetanus, occur after the introduction of this plan.

It is quite possible that the dangers attendant upon midwives in Raleigh might be materially lessened through the licensing of these women, and the requiring of such evidence of knowledge as would fit them for the work which they are daily performing. They may be gathered into a class and, through talks and demonstrations, taught many of the things they should know. This alone is not sufficient, however, and such an effort should include the closest of supervision, through a corps of public health nurses, who could visit all cases attended by midwives and check up the methods they have employed in caring for their patients. Examinations, both theoretical and practical, should be held, and those who may not be able to give evidence of adequate knowledge should at once be eliminated from practice.

We realize fully that many women, for economic or other reasons, have been accustomed to employ midwives, and that a considerable hardship might ensue were they all excluded from practice. This should be done gradually, and it is quite possible that, were sufficient encouragement given, nurse-midwives might be induced to enter the field. If, however, this is impossible, we deem that the matter is of sufficient importance for the municipality to furnish free or part-pay obstetrical service to such of its mothers as cannot afford to secure service of an efficient character.

The most valuable agency available in infant welfare work is unquestionably a public health nursing service. At the present time Raleigh is expending \$900 a year for a part of the salaries of two nurses. In addition, the public health nursing service, assisted by the Health Department of the Woman's Club, the Metropolitan Life, and the Extension Department of the State Board of Health, employs two nurses. We understand that the greater part of the work of these nurses consists of bedside nursing, although a few mothers' conferences have been held, and some work is done by them in connection with the medical inspection of school children. There are no prenatal or baby clinics, however, and comparatively little educational work in home and baby hygiene is carried out. It would seem highly desirable that the city employ at



least two additional nurses, and we believe that better work would be done were all the nursing agencies coördinated under a supervising nurse and possibly an advisory committee, on which each interested organization should be represented, as the Woman's Club, the State Board of Health, and City Board of Health, etc.

Through such a coöperative plan it would be possible, we feel, to district the city in such a manner that there would be no overlapping on the part of the various nursing services. Each nurse would undertake, within the limits of her district, all kinds of public health nursing, infant welfare work, contagious disease work, and the follow-up work incidental to a modern school inspection service.

In addition, there should be established one or more clinics or health centers, to which expectant mothers and mothers with young babies might come for instruction, supervision, and treatment. At these centers there should be in attendance both nurses and physicians, and expert medical consultation should be available when needed. There should be accommodations for both a waiting-room and an examination room, and a permanent system of records and filing should be provided. We must never lose sight of the fact that by far the greater part of all sickness and deaths occur in the homes; that much of this is preventable, and that the basis of all sound control measures is education.

The greatest single cause of infant mortality in American cities today is the ignorance of mothers; yet we believe that these same mothers are only too willing and anxious to receive the expert training which they need to fit them for bearing and rearing strong, healthy citizens. No class of preventable diseases are so easily influenced as are those which occur among a city's babies. In no branch of preventive medicine will such gratifying results be obtained and none affect so profoundly public health and welfare. A generalized nursing service makes, we believe, for better-rounded nurses and for an intimate knowledge of local conditions on the part of the component individuals. The most valuable part of all work designed to control the spread of communicable disease is that which the public health nurse is able to do in the home. No physician or sanitary inspector or other agent of the health department may so well interpret, to those in need of such instruction, the knowledge essential to the protection of others—knowledge of the sources and modes of transmission of disease. It may be pretty definitely stated that the sickness and death rates of any community will be determined directly by the ignorance or knowledge of its mothers, and whatever system of control fails to take this fact into consideration will inevitably fail in its purpose.

It would appear that the infant mortality of Raleigh, considerably higher, as it is, than that of the birth registration area as a whole, demands aggressive methods of control, and the findings of this service indicate that well planned activities will result in saving a very considerable number of lives each year, and also in lessening, to a very great degree, the amount of sickness and misery which exists among its babies.



### WATER SUPPLY

The water supply of Raleigh is derived from a patrolled watershed by impounding the waters of Walnut Creek in a reservoir of 200,000,000 gallons capacity, located two and a half miles west of the city. Water is carried through a pipe line to the suction well, whence it is pumped to the chemical house, where the proper amounts of alum and soda ash are added. Thence the water runs to the coagulating basin, wherefrom it flows by gravity to the filters, which are of the mechanical type and consist of seven units. From the filter the water passes to the clear well, which has a capacity of 2,000,000 gallons; hypochlorite of lime to disinfect the supply is added, and the water is pumped to the distributing main.

The filters have a daily capacity of three and a half million gallons, which is ample for the present needs of the city. The filter plant is run in an efficient manner by a superintendent who has long had charge of it.

The distribution system serves about 80 per cent of the population, and might easily be extended so as to serve the whole city. There are 4,096 taps, about 6 per cent of which are backyard hydrant connections. It is estimated that about 5,000 people are unable to connect with the distribution system.

In the house-to-house canvass it was found that in the well-to-do district, where 284 premises were visited, all but one were connected, and the house that was not connected had the water available. In this same district it was found that for domestic purposes 350 families were using the city water, and 25, or 6.6 per cent, were using well water. In the district inhabited by middle-class people 360 premises were visited. It was found that 320 places were connected, and 40 unconnected, with the city water mains. To those not connected the city water was available to 18, or 45 per cent. In this district 375 families used city water for domestic purposes, and 50, or 11.7 per cent, used wells. In the district inhabited by the poorer citizens 327 houses were found connected and 91 not. Of the latter, 42, or 48.3 per cent, can connect if they wish to. Of these poorer families, 184 use city water for domestic purposes and 322, or 63.6 per cent, use well water.

These figures are very interesting, because it is reported that the wells of the city are generally polluted. They indicate that effort should be made to compel all of those householders who have the city water available, to connect, and to abolish those wells that are polluted. Besides, the water mains should be extended so as to make the public supply usable by all.

It is true that polluted well water may be used for some time without causing epidemics of acute contagious diseases, though perhaps the water does cause minor intestinal disturbances from time to time amongst those who drink it. Such polluted wells, however, are always poten-



tially dangerous because, if it is possible for polluting matter to find entrance into the water, it is also possible for matter containing the germs of infectious disease to. Consequently, polluted wells only await the advent in the neighborhood of a person sick with intestinal infection to become infected with his discharges, if they are so carelessly disposed of that they may gain access to the wells, in which case the water will distribute the germs of disease amongst those who use it. The result is an epidemic. The literature of epidemiology is replete with instances of communities tolerating polluted wells for longer or shorter periods without experiencing disastrous results, and then suddenly being brought low by these polluted wells becoming infected. Raleigh should deal with the question of these polluted wells vigorously. By a campaign of education it should inform the people as to the dangerous character of these wells, and as rapidly as possible, by the process of the law, should abolish them.

While in Raleigh, Mr. Dodd tested the filtered water and found no evidence of the presence of germs of intestinal origin.

Besides the public supply, there is within the city of Raleigh the private supply of the Pilot Cotton Mills, which is derived from an aquifer 80 feet below the surface. The first 20 feet of the well is a cast iron pipe, which is carried down to solid rock. The supply is used by between 200 and 300 people. Tests made by the Delineator Bacteriologist indicated that the water was perfectly safe.

### MILK

The milk supply of Raleigh is derived from twenty-seven farms, all located within a radius of five miles of the city. These dairies are inspected regularly, at intervals of about forty days, by the city dairy inspector; and more frequently if occasion arises for his advice. The noninfected herds are tuberculin tested once a year; those that have been found to harbor cases of tuberculosis are tested every six months by the city milk inspector, who is a veterinarian. There is no regular medical inspection of the dairy employees, but of 83 people living on fifteen dairy farms, 56, or 67 per cent, had the typhoid inoculation; also 17 milk handlers out of 20, working on seven dairy farms, have had the typhoid treatment. In these instances, when the typhoid prophylactic was given, observations were made to determine whether there were any cases of human tuberculosis. The milk code requires that every case of disease, which may be milk-borne, must be reported to the milk inspector on its appearance on premises where milk is produced or handled. All of these precautions are highly commendable.

Practically all of the milk is pre-cooled, though a few of the dealers deliver their milk twice a day, right after milking, without cooling. In the winter-time a majority of dairymen deliver milk once daily; in the summer-time most of them deliver twice a day. This practice of de-



livering milk twice a day would seem to be unnecessary if the milk were properly cooled, and it seems probable that the dairymen could save money by making one delivery. Therefore, it is urged that both the public and the dairymen would gain by general adoption of the single-delivery system.

The milk is transported from the farms in covered or uncovered wagons and in five auto trucks. No milk is brought to the city either by electric or steam roads. There is no supply of pasteurized or certified milk in the city. Although one dealer advertises on his wagons that he sells certified milk, this is untrue, for his supply is not certified by any medical milk commission.

Only two stores sell milk. As they handle it in bottles and are inspected regularly, good conditions attend the handling of the milk.

The cream supply is derived from local farms, and is produced under the same conditions as is the milk. None of the cream is pasteurized.

There are no city milk plants.

Since August, 1917, the milk has been graded according to the method of the Dairy Division of the United States Department of Agriculture. One dealer has Grade A milk. Milk is sold at wholesale at 40 to 64 cents a gallon, and is retailed at from 15 to 18½ cents a quart.

The daily consumption of milk is estimated to be 2,100 quarts, of which about 1,300 quarts are retailed, giving a per capita consumption in the retail trade of about one-fifth quart.

In addition to the regular dairies, there are, it is estimated, 192 cows owned privately in the city. In the house-to-house canvass the city was divided into three districts representing the better, medium, and poorer class dwellings. In the first of these, six privately owned cows were found; in the second, 11; and in the third, 32. If these figures are representative, it would seem that the keeping of cows in the city limits is confined largely to the poorer class of citizens. As a general rule, the keeping of cows by the poorer people needs some supervision, because the quarters are apt to be crowded, and the animals are likely to be housed in poorly constructed quarters where they will be more or less of a nuisance to the neighbors. It is therefore recommended that supervision of some sort be exercised over the privately owned cows in the city limits.

Control of the supply is exercised by the scoring of the dairies about once in forty days, and by the examination of milk samples at the A. and E. College, where bacterial counts are made. The results of milk work are published in the local papers and in the monthly bulletin of the Raleigh Board of Health. This publicity undoubtedly has a good effect. It would be well if the Board of Health would foster the dairy industry by endeavoring to interest all classes of citizens in the good work the farmers are doing, and to commend their product heartily.

Mr. Dodd, the Delineator Bacteriologist, visited and scored 22 dairies supplying Raleigh. The average score on the Delineator score-card was



84.75, the maximum 94.0, and the low score 58.3. This is a remarkably good showing, and the city is to be congratulated on having a milk inspector who has brought the dairy farms to such a commendable condition. In particular, it is noted that the dairymen are using the small-top milk pails, and that most of them have good facilities for sterilizing utensils. Most of the milk seems to be properly cooled, although some dairymen either lack the equipment for cooling, or are delivering milk warm. There would seem to be no reason why all of the dairymen should not be required to cool their milk, and deliver it cold.

In one respect there appears to be room for decided improvement. Comparatively few of the privies on the dairy farms were fly-proof, and in many instances were not located at sufficient distance from the place where the milk was handled. This is a very important matter, because epidemics are on record that have been caused by flies infecting milk from infected privies. It is advised that a campaign to get the dairy farmers to construct fly-proof privies be started.

Mr. Dodd collected and tested 41 samples of milk. He found that the average butter-fat content was 4.3 per cent, the maximum 7.7 per cent, and the minimum 3.3. Only five samples tested less than 4 per cent butter-fat. This shows that the city is getting milk of high nutritive value. None of the samples suggested skimming, and but two watering.

The bacterial tests of the milk indicated, as might be expected from conditions observed on the farms, that the milk was very clean. Thirty-five of the samples showed less than 60,000 bacteria per cubic centimeter; four between 60,000 and 200,000; and two showed a content of between 200,000 and 1,000,000. Milk containing under 60,000 bacteria is exceptionally clean; that with a bacterial content of less than 200,000 is good milk. Furthermore, the tests showed a highly satisfactory condition. However, it is to be remembered that the examination of the supply was made in winter-time, when conditions do not favor bacterial multiplication, and that samples were taken for testing soon after milking, which would allow little time for bacteria to increase in numbers. So higher results might be expected in the summer-time, or if the milk were handled less promptly.

### FOODS OTHER THAN MILK

Food inspection in Raleigh is provided for through an inspector who covers hotels, restaurants, and other places where food is sold. His inspections include the quality of the food exposed for sale and the sanitary conditions under which it is stored. As a general rule, food stores are clean.

During the recent canvass there were inspected a total of 78 stores. Of these stores 11 were found to be selling milk in bottles, while in 13 "dipped" milk was sold. This latter practice is a dangerous one and should be prohibited by law, as it is practically impossible to prevent contamination of milk when it is sold from a can or other receptacle



which is repeatedly opened for the dispensing of its contents. Protection of raw foods and of those intended to be consumed without further cooking was adequate in 66 instances and inadequate in 12. Dry sweeping was found to be employed in 25 of the stores inspected. Refrigerators, shelves, showcases, and other places where food is held or exposed for sale were clean in 52 cases, unclean in 26.

In two instances food was found to be stored or prepared in adjacent living rooms. This is a dangerous practice which should be stopped. It was also noted that in sixteen instances living rooms opened directly into the stores.

The screening of windows and doors was effective in 40 cases, ineffective in 38.

The most important findings in connection with this inspection of Raleigh's food stores are those relating to washing and toilet facilities. Thus, it was found that, of those places where food was prepared for sale, only three had adequate facilities for the washing of food utensils.

Of even greater importance were the washing and toilet facilities afforded the employees of the 78 stores. In only 34 were these of such a nature as to facilitate the cleanly handling of food. It should be remembered that the most dangerous pollution to which food is exposed is that which is had through unclean human contact, and that every opportunity should be given to food-store employees to be clean in their persons.

In this same connection employees should be subjected, as a prerequisite to employment, to an examination for the existence of diseases transmissible through food. Reëxamination should be made at regular intervals or whenever there may be some special indication for so doing.

### SEWERAGE

The sewerage of the city of Raleigh is of the separate type, since it is designed to carry sanitary sewage only. Seventy-five per cent of the population is served by the sewers, and there is a law compelling those dwelling on sewered streets to connect. The quarter of the city occupied by the Negroes is without sewerage, for the reason that they object to the expense of installing the lines.

There are three outlets to the sewer; two empty into Walnut Creek about one and a half miles outside of the city limits, at a point two and a half or three miles below the water-works intake; the other outlet discharges into Crabtree Creek. Both of these creeks are tributaries of Neuse River.

The sewage is disposed of by dilution, both creeks having sufficient flow to carry off the sewage without nuisance.

Besides the public sewerage system, the Raleigh Cotton Mills have a sewer leading to a branch of Crabtree Creek, and so does the gas works; the Caraleigh Mills have one to Walnut Creek; and the Insane Hospital also has a private sewer to Walnut Creek.



The cleaning of privies is done by the city, owner paying a tax of \$2.50, which supports the service. Night-soil is used as fertilizer on the city farm, but only in fields where corn or fodder for animals is raised.

The house-to-house canvass showed that in the district occupied by the better-class people, of 351 houses visited, all were connected. In the district occupied by the middle-class people, 275 houses were connected with the sewer, and 85, or 23.6 per cent, were not connected. Of those not connected, 55, or 64.6 per cent, had the sewer abutting their premises. In the district where the poorer-class people dwell, 284 houses were connected with the sewer, and 134, or 32 per cent, were not. Of those not connected, 40, or 29.8 per cent, had access to the sewer. In this district, inhabited by the poorer class of citizens, it was found that 172 families were dwelling in houses connected with the sewer, and 336, or 66.1 per cent, were using privies.

In the district inhabited by the middle-class people, 57.6 per cent of the privies were reported as not being fly-proof; and in that occupied by the poorer class, 79.1 per cent were so reported.

These figures show that, outside of the district occupied by the well-to-do citizens, the privy question is one that demands consideration. The privy, unless properly constructed, screened, and cleaned at frequent intervals, is a source of danger to the neighborhood, for flies visit the vaults to feed and carry the filth, which may contain the germs of disease, into the homes in the vicinity. The consequence is that the neighborhood infested with privies and flies is apt to be one that has an undue amount of intestinal disease, and one which in fly-time possibly may harbor an epidemic of typhoid fever.

Privies should be eliminated from a city just as fast as sewerage is installed. The object of a sewerage system is to get rid of human waste promptly. If it does not accomplish this object, it fails, in large measure, of its purpose, and the money that was spent in building the expensive system is wasted. Therefore, every effort should be made in a well-sewered district to compel the connection of all houses with the sewer, and to abolish all privies. In districts that are unsewered the effort should be made to see that all privies are made fly-proof and rat-proof, and to compel property owners to clean them often. Besides, the effort should be made to get the householders to appreciate the advantages of a sewer system, and to get them to introduce it. Usually, if the right approach is made to the citizens, they can be made to see that their property will be made more valuable, and their lives more comfortable, by the introduction of sewers, and they will deny themselves somewhat in order to secure their benefits. It is advised that the city of Raleigh secure the abolition of all privies in the sewered district, and maintain close supervision of the privies in the district where sewers have not been built, to the end that they may be screened, of sanitary construction, and kept clean.



### WASTE DISPOSAL

Householders are not required to separate garbage from dry refuse. There is a regular garbage collection one or more times a week in the majority of homes, but the house-to-house canvass showed that in 40 per cent of the homes, in houses of the better, middle, and poorer classes, collections were made irregularly. A number of the middle- and poorer-class people fed garbage to hogs, and with the latter class of citizens feeding of garbage to chickens was a favorite method of disposal. There is no law requiring householders to have water-tight, covered cans for garbage. The house-to-house canvass showed that of the better-class people, 43.8 per cent were not using covered cans, that 75 per cent of the middle class were without them, and that 92 per cent of the poorer class did not have them. These figures show conclusively that proper receptacles for the keeping of garbage are not in common use in Raleigh. This is a matter which should be remedied, because garbage that is exposed attracts flies, rats, dogs and cats, and therefore not only is more or less of a nuisance, but may, through the agencies of flies and rats, assist in the dissemination of disease.

The feeding of garbage to chickens and hogs needs to be supervised, because if it is carelessly done it may create nuisance and serve as a magnet for flies, making the neighborhood unpleasant to dwell in.

It is stated that ashes and cans are used to fill in low places, and that papers are burned at the City Incinerator. Such filling in of these low places needs to be carefully handled to prevent any burning of putrescible refuse.

### STABLES

It is reported that there are about 477 stables within the limits of the city of Raleigh. A stable ordinance was adopted June 6, 1916. It seems to cover the method of keeping the manure and its removal adequately, but it does not take up the proper construction of the stable itself.

The house-to-house canvass showed that in a district inhabited by the well-to-do citizens there were 8 stables, 2 of which had wooden floors and 6 dirt floors. In that where the middle-class people dwelt there were 20 stables, 4 with wooden floors and 16 with dirt. In the section of the city occupied by people of the poorer class there were 28 stables, 3 with wooden floors and 25 with dirt. Neither wooden floors nor dirt floors are satisfactory for stables. The best stable floors are built of cement. Wooden floors, where they are absolutely tight, are not objectionable; but very few wood floors are built so there are no cracks where fly-blown manure may lodge or so that such manure cannot collect beneath them. Dirt floors are wholly unsatisfactory, because they favor fly-breeding. At a certain stage of their existence the fly larvæ migrate from the manure into the urine-moistened earth of the stable and there complete development to the full-grown insect.



The stable ordinance should require water-tight floors and absolutely prohibit those of dirt. Stable owners constitute but a small part of the community, and are in a sense a privileged class. Therefore, they should be required to build and maintain their stables in such a way that their neighbors will neither be pestered by flies nor exposed to the danger of such diseases as are transmitted by these filthy insects. A community that permits fly-breeding stables, the keeping of garbage in exposed condition, and the existence of badly built, unscreened privies, is likely to be one in which diarrheal diseases are unduly prevalent in summer-time, and which may even support epidemics of typhoid fever.

Besides the private stables, there are nine public tie-ups in town that are not kept clean. Of course, these places are fly-breeders, and should be properly looked after.

The stable ordinance provides for the frequent inspection of stables in summer-time. As the Delineator survey was not conducted at that season of the year, an estimate cannot be formed of the efficiency of this inspection. However, it may be remarked that whether the inspection is sufficient or not, the difficulty of keeping the city free from flies is greatly increased by permitting the badly constructed stables and exposed manure piles to exist at all. The time is past when a fly-infested city will be regarded favorably by homemakers or will rank well in the estimate of business men. Therefore, the fly question should be dealt with in Raleigh in an uncompromising manner.

### THE KEEPING OF HOGS

The house-to-house inspection showed that a few people in both the better- and middle-class districts kept hogs, and that many more do in the section occupied by the people of the poorer class.

It appears that the ordinance of the city which required that hogs be kept a distance of 75 feet from any dwelling was modified in December, 1917, to permit hogs to be kept within 25 feet of any dwelling or water supply, unless there was objection from the neighbors. This action was taken as an economic measure to encourage the production of pork in war times.

While it is universally recognized that our food supply must be increased at the present time, we are prone to overlook the fact that because our daily ration is less generous than it has been, on account of the high cost of food, not a few people are actually not getting enough to eat, and that they are therefore living in a way which makes them more susceptible to disease. Such being the case, the protection of the public health becomes a matter of greater importance than ever, and everything that may endanger the health of the individual should be carefully looked after.

It is very difficult to keep hogs in such a way that they do not make the neighborhood unpleasant with their odors and attract flies. A great



deal of the trouble originates in the way the animals are fed. The greatest care has to be exercised that decomposed food does not accumulate in the pens and around them. Consequently, in view of the fact that the amended ordinance permits hogs to be kept close to dwellings, provision should be made for the frequent inspection of the hog-pens, and the inspector should have the power to stop any owner, who is maintaining a nuisance, from keeping the animals.

### MOSQUITOES

It appears that although both the *Anopheles* (malaria) mosquito and *Stegomyia* (yellow fever) mosquito occur in Raleigh, no efforts have been made to eliminate mosquito breeding. The Old Mill Race in the north-west section of the city is reported to be a favorite breeding place of the malarial mosquito, and the swamps southeast of the city, just outside the city limits, and two ponds in the City Park, are also reported as mosquito breeders. In addition to these sources of the mosquito, the house-to-house canvass showed the insects were breeding around the better, well-to-do, and poorer class of homes in sagging gutters, rain barrels, and open receptacles of various sorts. As might be expected from this, mosquitoes were reported to be troublesome in all these classes of homes.

It was reported that malaria in a mild form is prevalent about the city, although it does not figure as a common cause of morbidity.

There is no reason why the citizens of Raleigh should tolerate the mosquito nuisance. Many American communities have freed themselves entirely from the pests. Even those communities that were bothered only by the common house mosquito, which does not cause disease, have found it worth while to prosecute campaigns for the elimination of mosquito breeding places, and have felt well repaid for their efforts, because their homes were made comfortable and enjoyable in summer. In the case of Raleigh, which is breeding both the malarial and yellow fever mosquito, there is every reason why such a campaign should be waged, and it is urged that the City Engineer or some other competent person be put in charge of such a campaign in the near future.

### THE HEALTH DEPARTMENT

The Health Department consists of a Board of Health, a part-time city health officer, and a city physician, a full-time clerk and registrar of vital statistics, and a full-time sanitary inspector. The department also appropriates \$900 a year for visiting nursing.

The chief defects of the department are as it relates to infant mortality work and tuberculosis. The latter disease is reported only fairly well. The sanitary officer visits cases and furnishes instructions and disinfectants to prevent the spread of infection; and there is some opportunity to place patients at the county home. The Health Committee of the



Woman's Club has also tried to give impetus to the work through the sale of Red Cross seals. These various efforts cannot, however, be taken as the equivalent of a well-knit campaign against the disease. Nurses should be available to visit cases, facilities for the early diagnosis of cases and their proper treatment when the patient cannot afford a private physician should be provided, and suitable sanatorium treatment should be provided when necessary.

A health department nurse would also be very valuable in the case of the common contagious diseases and typhoid fever. At present the contagious are placarded by the sanitary officer. A nurse would, however, be able to enter the home and show the mother, or other person having the patient in charge, just how to properly disinfect the patient's discharges at the bedside so that the spread of infection might be prevented. It is this type of disinfection, rather than fumigation, that is vital in controlling these diseases. The same is true with regard to typhoid fever. In this connection a word of praise should be said for the typhoid vaccination campaign carried on by the Board of Health. In the last five years upwards of 7,000 citizens took the protective inoculations, and the benefits may be seen in the decreasing typhoid rate among residents.

We would recommend that the Health Department supply two public health nurses in addition to the two now at work. We would also urge that the city's health work be placed in the hands of a full-time trained or experienced health officer. The nurses are essential for the detailed disease-combative work in the homes; the health officer is necessary to direct the work, to organize new work, and to give coherence to the whole effort.

The expense incidental to the employment of the above persons is not prohibitive. The persons mentioned may be obtained for \$6,000 a year. Allowing for the maintenance of the existing clerk and inspector and for incidental expenses, it is evident that the total expense may be kept below \$10,000 a year, which is less than 50 cents per capita—the minimum recommended by experts for a well-rounded health department. Such figures should be compared, furthermore, with the city's existing expenditures of \$1.38 and \$1.66 for fire and police departments respectively. The sum recommended would represent, we believe, a real economy when the saving in the way of the avoidance of sickness and death is considered.

### SUMMARY AND CONCLUSION

To briefly summarize the most needed changes in health work in Raleigh, we would suggest that, while birth and death registration are quite satisfactory, the department should continue its efforts to secure complete returns; and in the case of deaths, there is room for some improvement in the character of certification.

Active measures should be taken to better control preventable infant



deaths. Chief among these, we would suggest the employment of more public health nurses and the establishment of a clinic or health center.

Again are public health nurses distinctly indicated for the better control of communicable diseases and the more intelligent enforcement of quarantine regulations on the part of those caring for contagious cases.

While the milk supply on the whole is very satisfactory, it would seem advisable to require the sanitary construction of privies on dairy farms and their removal, in some instances, to a location farther from the places where milk is handled.

The water system should undoubtedly be extended to include sections of the city not at present supplied, and the wells, many of which are doubtless polluted, should be eliminated as rapidly as possible.

Where sewers are available, connections should be enforced in every instance, and it should be the aim of the city authorities to extend the sewer system to all sections of the city. Pending the accomplishment of this, privies should be required to be so constructed as to be fly-proof, and not to permit of the pollution of surface wells.

In food stores, better washing and toilet facilities are distinctly needed, and, in certain sections especially, better protection should be had from insects.

Under the organization of the Health Department, the employment of a full-time health officer is, we feel, absolutely essential, if the citizens of Raleigh are to secure the character of service which its high rates from certain causes, and especially its high infant death rate, indicate is needed. In addition to this, a sufficient number of public health nurses should be employed to carry into the homes such preventive activities as have been indicated, and which may not be accomplished through any other agencies.

While the institution of these methods represent a rather wide departure from the present health activities of the city, we feel that they are essential to any material improvement in the city's sanitary standing, and that their institution will unquestionably result in a marked reduction of sickness and deaths from preventable disease. Certainly, no better policy could be adopted by any municipality than that of the adequate control of conditions prejudicial to community health and efficiency.

Respectfully submitted,

C. E. TERRY, *Health Editor.*

Assisted by H. N. PARKER,

F. SCHNEIDER, JR.,

*Delineator Seventh Baby Campaign.*

February 15, 1918.



DEATHS OF INFANTS UNDER ONE YEAR, BY CAUSE,  
RALEIGH, N. C., 1915-1917

(*Stillbirths Excluded*)

*Susceptible to Prenatal Influence:*

Premature birth .....	66
Congenital malformation .....	4
Congenital debility .....	21
Other causes peculiar to early infancy .....	12
Total .....	103

*Susceptible to Postnatal Influence:*

Diarrhea and enteritis .....	56
Pneumonia .....	28
Whooping-cough .....	4
Syphilis .....	3
Meningitis .....	4
Bronchitis .....	5
Tuberculosis .....	3
Total .....	103
All other causes .....	24
Grand total .....	230

TABLE 1. ESTIMATES OF POPULATION, RALEIGH, N. C., 1913-1917  
(*United States Bureau of the Census, Bulletin 133*)

Year	Estimated Population for July 1		
	Total	White	Colored
1913 .....	19,686	12,346	7,340
1914 .....	19,833	12,502	7,331
1915 .....	19,980	12,658	7,322
1916 .....	20,127	12,815	7,312
1917 .....	20,274	12,972	7,302



TABLE 2. TOTAL DEATHS AND DEATH RATES, BY YEAR,  
RALEIGH, N. C., 1913-1917*(Exclusive of Stillbirths)*

Year	Deaths			Rate per 1000 Population		
	Total	White	Colored	Total	White	Colored
1913 .....	491	267	224	24.9	21.6	30.5
1914 .....	603	302	301	30.4	24.2	41.1
1915 .....	549	299	250	27.5	23.6	34.2
1916 .....	561	279	282	27.9	21.8	38.6
1917 .....	576	307	269	28.4	23.7	36.8
Totals .....	2,780	1,454	1,326	27.8	23.0	36.2

NOTE.—Figures for deaths 1913-1915, inclusive, from the United States Bureau of the Census. Figures for 1916 and 1917 from the local registry office.

TABLE 3. DEATHS AND DEATH RATES FROM TUBERCULOSIS (ALL  
FORMS), BY YEAR, RALEIGH, N. C., 1913-1917

Year	Deaths			Rate per 100,000 Population		
	Total	White	Colored	Total	White	Colored
1913 .....	40	18	22	203.2	145.8	299.7
1914 .....	62	29	33	312.6	232.0	450.1
1915 .....	49	25	24	245.2	197.5	327.8
1916 .....	59	29	30	293.1	226.3	410.3
1917 .....	47	19	28	231.8	146.5	383.4
Totals .....	257	120	137	257.2	189.6	374.2

NOTE.—Figures for deaths 1913-1915, inclusive, from the United States Bureau of the Census. Deaths for 1916 and 1917 from the local registry office.



TABLE 4. DEATHS AND DEATH RATES FROM TYPHOID FEVER, BY YEAR, RALEIGH, N. C., 1913-1917

Year	Deaths			Rate per 100,000 Population		
	Total	White	Colored	Total	White	Colored
1913.....	13	7	6	66.0	56.7	81.7
1914.....	12	7	5	60.5	60.0	68.2
1915.....	9	4	5	45.0	31.6	68.3
1916.....	12	3	9	59.6	23.4	123.1
1917.....	10	3	7	49.3	23.1	95.9
Totals.....	56	24	32	56.1	37.9	87.4

NOTE.—Figures for 1913-1915, inclusive, from the United States Bureau of the Census. Figures for 1916 and 1917 from the local registry office.

TABLE 5. INFANT MORTALITY, BY YEAR, RALEIGH, N. C., 1913-1917  
(Exclusive of Stillbirths)

Year	Deaths Under 1			Rate per 1000 Live Births		
	Total	White	Colored	Total	White	Colored
1913.....	77	36	41	134.4	99.2	195.2
1914.....	105	41	64	193.4	126.9	290.9
1915.....	77	35	42	148.9	104.8	229.5
1916.....	73	24	49	132.0	70.8	229.0
1917.....	80	29	51	147.3	89.8	231.8
Totals.....	412	165	247	151.0	98.1	235.9

NOTE.—Figures for deaths 1913 to 1915, inclusive, from the United States Bureau of the Census. Figures for deaths 1916 and 1917 from the local registry office.

Based on the total number of births during 1917, registered and un-registered, the rate is as follows:

	Total	White	Colored
Deaths under 1.....	80	29	51
Rate per 1000 live births.....	145.4	89.3	225.7



TABLE 6. BIRTHS AND BIRTH RATES, BY YEAR, RALEIGH, N. C., 1913-1917

Year	Births			Rate per 1000 Population		
	Total	White	Colored	Total	White	Colored
1913.....	573	363	210	29.1	29.4	28.6
1914.....	543	323	220	27.4	25.8	30.0
1915.....	517	334	183	25.9	26.4	25.0
1916.....	553	339	214	27.5	26.5	29.3
1917.....	543	323	220	26.8	24.9	30.1
Totals.....	2,729	1,682	1,047	27.3	26.6	28.6

NOTE.—Figures for births from local registry office.

Figures for 1917 do not include 2 white and 6 colored births, unregistered, but found in canvass. Including these, the 1917 figures are as follows:

	Total	White	Colored
Total births.....	551	325	226
Rate per 1000 population.....	27.1	25.1	31.0

TABLE 7. STILLBIRTHS, BY YEAR, RALEIGH, N. C., 1913-1917

Year	Stillbirths			Per Cent of Live Births			Rate per 1000 Population		
	Total	White	Col'd	Total	White	Col'd	Total	White	Col'd
1913.....	43	10	33	7.50	2.76	15.71	2.18	.81	4.50
1914.....	63	15	48	11.60	4.64	21.82	3.17	1.20	6.55
1915.....	39	16	23	7.54	4.79	12.57	1.95	1.26	3.14
1916.....	53	20	33	9.58	5.90	15.42	2.63	1.56	4.51
1917.....	41	14	27	7.55	4.33	12.27	2.02	1.08	3.70
Totals.....	239	75	164	8.76	4.46	15.66	2.39	1.19	4.48

NOTE.—Figures for stillbirths from local registry office.



SUMMARY OF DAIRY FARM SCORES, RALEIGH, N. C.,  
JANUARY, 1918

EXAMINATIONS BY MR. W. L. DODD

Total Score	Primary Equipment			Primary Methods		
	Milk- ing	Cool- ing	Steriliz- ing	Milk- ing	Cool- ing	Steriliz- ing
94.00	9.0	6.0	10.0	19.0	15.0	20.0
93.00	9.0	6.0	10.0	19.0	15.0	20.0
92.40	8.5	6.0	10.0	19.0	15.0	20.0
91.75	8.5	6.0	10.0	19.0	15.0	20.0
91.45	8.5	6.0	10.0	19.0	15.0	20.0
90.40	8.5	6.0	10.0	19.0	15.0	20.0
89.75	8.0	6.0	10.0	19.0	15.0	20.0
89.45	8.0	6.0	10.0	19.0	15.0	20.0
88.80	8.0	6.0	10.0	19.0	15.0	20.0
87.40	8.0	6.0	10.0	19.0	15.0	20.0
84.80	8.0	6.0	10.0	19.0	15.0	20.0
83.70	8.0	6.0	9.0	19.0	10.0	20.0
83.50	8.0	5.5	8.5	19.0	10.0	20.0
82.35	8.0	5.5	7.0	19.0	10.0	17.0
82.10	8.0	4.5	7.0	19.0	10.0	17.0
81.65	8.0	4.5	7.0	19.0	10.0	17.0
81.40	8.0	2.0	7.0	18.0	10.0	17.0
74.05	8.0	2.0	7.0	18.0	10.0	15.0
69.15	8.0	2.0	7.0	18.0	10.0	15.0
66.65	7.0	2.0	7.0	18.0	10.0	15.0
62.45	6.0	2.0	5.5	17.0	5.0	15.0
58.30	3.0	2.0	4.0	11.0	5.0	15.0
Average.....84.75	7.8	4.7	8.1	18.0	12.0	18.3
Median.....84.25	8.0	6.0	9.5	19.0	13.0	20.0
Upper quartile ..90.40	8.5	6.0	10.0	19.0	15.0	20.0
Lower quartile...81.40	8.0	2.0	7.0	18.0	10.0	17.0



PER CENT OF FAT AND SPECIFIC GRAVITY OF SAMPLES OF MILK,  
RALEIGH, N. C., JANUARY, 1918

EXAMINATIONS BY MR. W. L. DODD

<i>Per Cent of Fat</i>	<i>Specific Gravity Corresponding</i>	<i>Per Cent of Fat</i>	<i>Specific Gravity Corresponding</i>
7.7-----	1.032	4.6-----	1.032
6.9-----		4.6-----	1.030
5.4-----	1.033	4.6-----	1.034
5.4-----	1.031	4.5-----	1.031
5.0-----	1.032	4.4-----	1.031
5.0-----	1.034	4.4-----	1.031
5.0-----	1.031	4.4-----	1.032
5.0-----	1.032	4.4-----	1.033
5.0-----	1.033	4.4-----	1.034
5.0-----	1.031	4.2-----	1.036
5.0-----	1.031	4.2-----	1.032
4.9-----	1.032	4.2-----	1.030
4.8-----	1.030	4.1-----	1.032
4.8-----	1.034	4.0-----	1.031
4.7-----	1.034	4.0-----	1.034
4.7-----	1.031	3.9-----	1.030
4.7-----	1.034	3.8-----	1.031
4.6-----	1.028	3.8-----	1.022
4.6-----	1.031	3.8-----	
4.6-----	1.032	3.3-----	1.025
4.6-----	1.028		

*Summary—Per Cent of Fat*

Average-----	4.3
Median-----	4.6
Upper quartile-----	5.0
Lower quartile-----	4.2



SUMMARY OF MILK TEMPERATURE TESTS, RALEIGH, N. C.,  
JANUARY, 1918

EXAMINATIONS BY MR. W. L. DODD

<i>Deg. F.</i>	<i>Deg. F.</i>	<i>Deg. F.</i>	<i>Deg. F.</i>
69	56	52	45
66	56	52	45
65	56	49	45
65	56	48	42
62	55	48	41
61	54	47	40
60	54	46	40
58	54	45	36
57	53	45	35
57			
Average.....		52	
Median.....		53	
Upper quartile.....		57	
Lower quartile.....		45	

BACTERIAL CONTENT OF SAMPLES OF MILK, RALEIGH, N. C.,  
JANUARY, 1918

EXAMINATIONS BY MR. W. L. DODD

	<i>Bacteria per Cubic Centimeter</i>		
400,000	18,000	5,500	2,000
250,000	16,000	5,000	1,500
200,000	15,000	4,500	1,500
125,000	12,000	4,000	1,000
82,000	10,000	4,000	1,000
78,000	9,000	3,500	1,000
56,000	8,000	3,500	1,000
45,000	7,000	3,000	1,000
40,000	6,500	2,500	1,000
30,000	6,000	2,000	7,000
25,000			
Average.....		35,000	
Median.....		6,500	
Upper quartile.....		27,500	
Lower quartile.....		2,250	



























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